

We Claim:

1. A system for transferring workpieces between a workpiece container and a processing tool, comprising:
 - a plate having a first mounting surface, a second mounting
5 surface, and at least one opening for the workpiece to travel through, said second mounting surface being adapted to fasten to the processing tool;
 - a load port assembly mounted to said first mounting surface of said plate;
 - a prealigner for aligning the workpiece;
 - 10 a workpiece handling robot adapted to transfer each workpiece between the workpiece container, the processing tool, and the prealigner; and
 - a controller for operationally controlling and coordinating said load port assembly, said prealigner, and said workpiece handling robot.
- 15 2. A system according to claim 1, wherein said second mounting surface forms an airtight seal with the processing tool.
3. A system according to claim 1, wherein said prealigner is mounted to said first mounting surface.
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4. A system according to claim 3, wherein said prealigner is located below said load port assembly.
5. A system according to claim 1, wherein said workpiece handling robot is
25 translationally mounted to said second mounting surface.
6. A system according to claim 1, wherein said second mounting surface is mounted to a front end of the processing tool.

7. A system according to claim 1, further comprising:
an enclosure having a first input/output port and a second input/output port, said first input/output port being mounted to said first mounting surface, and said second input/output port being mounted to a second processing tool, said enclosure being adapted to form and maintain an airtight seal with the processing tool and the second processing tool, and isolating the workpieces from outside ambient conditions while the workpieces are in transport between the processing tool and the second processing tool; and
a conveyor system located within said enclosure for transporting the workpieces between the processing tool and the second processing tool.
8. A system according to claim 1, wherein said prealigner may simultaneously store more than one workpiece.
9. A system for transferring workpieces between a workpiece container and a processing tool, comprising:
a plate having an opening for the workpiece to pass through, and adapted to fasten to the processing tool;
a load port assembly mounted to said plate;
a prealigner for aligning the workpiece; and
a workpiece handling robot for transferring the workpieces between the workpiece container, the processing tool, and said prealigner.
10. A system according to claim 9, further comprising:
a controller for operationally controlling and coordinating said load port assembly, said prealigner, and said workpiece handling robot.
11. A system according to claim 9, wherein said plate further includes a first mounting surface and a second mounting surface facing away from said first mounting surface.

12. A system according to claim 11, wherein said second mounting surface is being adapted to fasten to the processing tool.
- 5 13. A system according to claim 11, wherein said load port assembly is mounted to said first mounting surface.
14. A system according to claim 11, wherein said prealigner is mounted to said first mounting surface.
- 10 15. A system according to claim 11, wherein said workpiece handling robot is translationally mounted to said second mounting surface.
16. A system according to claim 14, wherein said prealigner is located below
15 said load port assembly.
17. A system according to claim 11, wherein said prealigner can simultaneously support multiple workpieces.
- 20 18. A system for transferring workpieces between a workpiece container and a processing tool, comprising:
a plate having an opening for the workpieces to pass through, and being adapted to fasten to the processing tool; and
at least two front end load components mounted to said plate, said
25 at least two front end load components being selected from the group consisting of (i) a load port assembly, (ii) an aligner, (iii) a workpiece handling robot, and (iv) a fan/filter unit.
19. A system for transferring workpieces between a workpiece container and
30 a processing tool, comprising:

a mounting structure having at least two openings for the workpieces to pass through, and being adapted to fasten to the processing tool;

at least two load port assemblies mounted to said mounting structure;

5 a prealigner for aligning the workpiece; and

a workpiece handling robot for transferring the workpieces between the workpiece container, the processing tool, and the said prealigner.

20. A system according to claim 19, wherein said mounting structure is
10 fastened to a front end of the processing tool.

21. A system according to claim 19, wherein each said load port assembly is mounted to said mounting structure proximate to said opening.

15 22. A system according to claim 19, wherein said prealigner is mounted to said mounting structure.

23. A system according to claim 19, wherein said workpiece handling robot is translationally mounted to said mounting structure.
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24. A system according to claim 23, wherein said workpiece handling robot is mounted on an opposite side of said mounting structure than said load port assembly.

25 25. A system according to claim 19, wherein said mounting structure is of unitary construction.

26. A system for transferring workpieces between a workpiece container and a processing tool, comprising:

30 a mounting structure having at least one opening for the

workpieces to pass through, multiple predetermined mounting areas, and is being adapted to fasten to the processing tool;

a load port assembly mounted to one of said multiple predetermined mounting areas;

5 a prealigner for aligning the workpieces; and

a workpiece handling robot for transferring the workpieces between the workpiece container, the processing tool, and the said prealigner.

27. A system according to claim 26, wherein said prealigner is mounted to
10 one of said multiple predetermined mounting areas.

28. A system according to claim 27, wherein said prealigner is located below said load port assembly.

15 29. A system according to claim 27, wherein said workpiece handling robot is translationally mounted to one of said multiple predetermined mounting areas.

30. A system according to claim 29, wherein said workpiece handling robot is located on an opposite side of said mounting structure than said load port
20 assembly.

31. A system for transferring workpieces between a workpiece container and a processing tool, comprising:

a wall having a first mounting surface, a second mounting surface,
25 and at least one opening for the workpiece to travel through, said second mounting surface being adapted to fasten to the processing tool;

a load port assembly mounted to said first mounting surface of said plate;

a prealigner for aligning the workpiece;

30 a workpiece handling robot adapted to transfer each workpiece

between the workpiece container, the processing tool, and the prealigner; and
a controller for operationally controlling and coordinating said
load port assembly, said prealigner, and said workpiece handling robot.

- 5 32. A system according to claim 31, wherein said wall is of unitary construction.
33. A system according to claim 31, wherein said second mounting surface forms an airtight seal with the processing tool.
- 10 34. A system according to claim 31, wherein said prealigner is mounted to said first mounting surface.
35. A system according to claim 34, wherein said prealigner is located below
15 said load port assembly.
36. A system according to claim 31, wherein said workpiece handling robot is translationally mounted to said second mounting surface.
- 20 37. A system according to claim 31, wherein said second mounting surface is mounted to a front end of the processing tool.
38. A system according to claim 31, further comprising:
an enclosure having a first input/output port and a second
25 input/output port, said first input/output port being mounted to said first mounting surface, and said second input/output port being mounted to a second processing tool, said enclosure being adapted to form and maintain an airtight seal with the processing tool and the second processing tool, and isolating the workpieces from outside ambient conditions while the workpieces are in transport between the
30 processing tool and the second processing tool; and

a conveyor system located within said enclosure for transporting the workpieces between the processing tool and the second processing tool.

39. A system according to claim 31, wherein said prealigner may
5 simultaneously store more than one workpiece.

40. A system for transferring semiconductor wafers between a SMIF pod and a processing tool having a front end, comprising:
a mounting element adapted to secure to the front end of the processing tool, said
10 mounting element includes a first mounting surface, and a second mounting surface spaced apart from and facing away from said first mounting surface;
an opening extending through said first mounting surface and said second mounting surface; and
a load port assembly mounted to said second mounting surface.

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41. A system according to claim 40, further comprising a wafer handling robot mounted to said first mounting surface.

42. A system according to claim 40, further comprising a prealigner assembly
20 mounted to said second mounting surface.

43. A system according to claim 40, wherein said first mounting surface is a substantially planar surface.

25 44. A system according to claim 40, wherein said second mounting surface is a substantially planar surface.

45. A system according to claim 40, wherein said opening is large enough to allow a wafer to pass through.

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46. A system according to claim 40, wherein said mounting element is of unitary construction.

47. A system according to claim 40, wherein the width of said mounting
5 element is substantially uniform and is no greater than four inches wide.

48. A mounting element being adapted to secure to the front end of a processing tool, and to mount semiconductor processing components to in a fixed and repeatable position with respect to each other, the mounting element
10 comprising:

a first mounting surface;

a second mounting surface spaced apart from and facing away from said first mounting surface;

at least one opening extending through said first mounting surface and said
15 second mounting surface; and

a load port assembly mounting area located in a predetermined position on said second mounting surface.

49. A mounting element according to claim 48, wherein each said opening is
20 sized to allow a wafer to pass through said opening.

50. A mounting element according to claim 48, further comprising a prealigner mounting area located in a predetermined position on said second mounting surface.
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51. A mounting element according to claim 48, further comprising a wafer handling robot mounting area located in a predetermined position on said first mounting surface.

30 52. A system for transferring wafers between a SMIF pod and a processing

tool, comprising:

a mounting element having a first mounting surface, and a second mounting surface spaced apart from and substantially parallel to said first mounting surface; an opening extending through said first mounting surface and said second mounting surface;
5 a load port assembly mounted to said second mounting surface;
a wafer handling robot mounted to said first mounting surface; and
a controller for controlling and coordinating the operation of said load port assembly and said wafer handling robot.

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53. A system according to claim 52, further comprising a prealigner mounted to said second mounting surface.

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54. A system according to claim 52, wherein said mounting element is of unitary construction.

55. A system for transferring wafers between a SMIF pod and a processing tool, comprising:

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a mounting element having a first mounting surface, and a second mounting surface spaced apart from and substantially parallel to said first mounting surface; an opening extending through said first mounting surface and said second mounting surface;
a load port assembly mounted to said second mounting surface; and
a wafer handling robot mounted to said first mounting surface.

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56. A system according to claim 55, further comprising a controller for controlling and coordinating the operation of said load port assembly and said wafer handling robot.

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57. A system according to claim 55, further comprising a prealigner.

58. A system according to claim 57, wherein said prealigner is mounted to said second mounting surface.

5 59. A system according to claim 58, wherein said prealigner is located below said load port assembly.

60. A system according to claim 55, wherein said first mounting surface and said second mounting surface are substantially planar surfaces.

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61. A system for transferring wafers between a SMIF pod and a processing tool, comprising:

a mounting element having a first mounting surface, and a second mounting surface spaced apart and facing away from said first mounting surface; and

15 at least two semiconductor processing components mounted to said mounting element, said at least two semiconductor processing components selected from a group consisting of (i) a load port assembly, (ii) a wafer handling robot, (iii) an aligner assembly, and (iv) a fan/filter unit.

20 62. A system according to claim 61, wherein said first mounting surface and said second mounting surface are substantially planar surfaces.

63. A system according to claim 61, wherein said mounting element is of unitary construction.

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